## REMARKS

Status of the Claims

Claims 1-8 are pending and under consideration in this application. All of the pending claims stand rejected. Claims 1 and 4 have been amended. Claim 3 has been cancelled without prejudice or disclaimer. Support for the amendments can be found in the originally filed claims and the specification at, e.g., paragraph 0013 and 0038. No new matter has been added.

Following entry of the amendments and claim cancellation herein, claims 1, 2, and 4-8 will be pending and under consideration in this application.

Rejection Under 35 U.S.C. § 112, Second Paragraph (Indefiniteness)

At page 2 of the Office Action, claim 4 was rejected under 35 U.S.C. § 112, second paragraph as allegedly being indefinite. According to the Office Action, "[c]laim 4 recites the limitation of 'non-uniformity in thickness" ... There is insufficient antecedent basis for this limitation in the claim." (See Office Action at page 2).

While not conceding to any aspect of the Examiner's stated reasons for rejection, and solely in the interest of expediting prosecution of this application, Applicants have herein amended claim 4 as follows: "wherein the hollow fiber membrane has a non-uniformity in thickness of 0.6 or more." (See amended claim 4 above). In view of the amendment, Applicants respectfully submit that the rejection of claim 4 is rendered moot.

Rejection Under 35 U.S.C. § 102 (Anticipation)

At pages 2 to 3 of the Office Action, claims 1-8 were rejected under 35 U.S.C. § 102(b) as allegedly anticipated by Kawata et al. (U.S. Patent No. 5,340,480). Applicants respectfully submit that the instant claims are patentable over Kawata et al. for at least the reasons below.

The standard for anticipation under 35 U.S.C. § 102 is that **each and every element of the claim must be found in the cited reference**. (See, e.g., MPEP § 2131 citing *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)).

Instant claim 1 (and the claims dependent therefrom) is drawn to a highly water-permeable hollow fiber type blood purifier comprising hydrophobic polymer hollow fiber membranes, each of which contains a hydrophilic polymer. The blood purifier is further defined by the following characteristics: (i) the amount of the hydrophilic polymer eluted from the hollow fiber membrane is 10 ppm or less; (ii) the ratio of the hydrophilic polymer in the outer surface of the hollow fiber membrane is 25 to 50 mass %; (iii) the burst pressure of the hollow fiber membrane is 0.5 MPa or higher; (iv) the coefficient of water permeability of the blood purifier is 150 ml/$m^2$/hr./mmHg or higher; and (v) the average hole area of the outer surface of the hollow fiber membrane is 0.3 to 1.0$\mu m^2$.

Kawata et al. discloses polysulfone hollow fiber membranes having an inner dense skin layer composed of a polysulfone and a lesser amount of a polyvinylpyrrolidone (PVP), the content of the PVP in the dense skin layer being higher than that in an outer surface layer. (See Kawata et al. at, e.g., Abstract and column 3, line 46 to column 4, line 28). However, Kawata et al. does not disclose each and every one of the aforesaid features of the instant claims. In fact, the Office Action even acknowledges that "**Patent '480 is silent regarding to specific elution of hydrophilic polymers** and crosslinking of the membrane to avoid the elution." (Emphasis added; see Office Action at page 3, section 5). Thus, Kawata et al. certainly does not disclose or suggest a blood purifier in which the amount of the hydrophilic polymer eluted from the hollow fiber membrane is 10 ppm or less, as required by claim 1. Kawata et al. also fails to disclose or suggest that the burst pressure of the hollow fiber membrane is 0.5 MPa or higher. Moreover, Applicants point out that the instant claims require an average hole area of the outer surface of the membrane of 0.3- 1.0$\mu m^2$. In contrast, Kawata et al. discloses that its hollow fiber membranes contain "a layer of a reticular texture having micropores of a 0.1-0.5 μm average pore diameter on the outer surface[,]" which corresponds to an average hole area of the outer surface of the membrane of 0.008-0.2 $\mu m^2$.

Furthermore, Applicants point out that the inventors of the Kawata et al. reference tested several exemplary polysulfone hollow fiber membranes, each of which had a ratio of the weight percent PVP in the skin layer on the inner surface to the weight percent of PVP in the outer

surface layer of between 2.0 and 23 %. (See Kawata et al. at Example 2 and Comparative Example 2, respectively). However, Kawata et al. does not disclose or even suggest hollow fiber membranes wherein the ratio of the hydrophilic polymer in the outer surface of the hollow fiber membrane is 25 to 50 mass %, as required by the instant claims.

Therefore, for at least the aforementioned reasons, Kawata et al. does not anticipate the claims. Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection under 35 U.S.C. § 102(b).

Rejection Under 35 U.S.C. § 103 (Obviousness)

At pages 2 to 4 of the Office Action, claims 1-8 were rejected under 35 U.S.C. § 103 as allegedly unpatentable over Kawata et al. (*supra*) alone, or Kawata et al. in view of EP1110563 A2 (hereinafter referred to as "the '563 patent"). Both of these rejections appear to be based on the rejection of Kawata et al., which reference is addressed in detail above.

As detailed above, Kawata et al. does not disclose each and every element of claim 1 (and the claims dependent therefrom). Moreover, there would have been no reason for one of ordinary skill in the art in reading Kawata et al. alone to arrive at the claimed invention.

The '563 patent does not cure the above-referenced deficiencies of Kawata et al. The '563 patent discloses, *inter alia*, a semi-permeable membrane for blood treatment that exhibits little change in performance upon drying and reduced elution of a hydrophilic polymer therefrom. (See the '563 patent at paragraph 0001). However, the '563 patent does not disclose or suggest a blood purifier comprising hollow filter membranes, each of which containing a hydrophilic polymer, wherein, e.g., the ratio of the hydrophilic polymer in the outer surface of the hollow fiber membrane is 25 to 50 mass %; the burst pressure of the hollow fiber membrane is 0.5 MPa or higher; and the average hole area of the outer surface of the hollow fiber membrane is 0.3 to 1.0$\mu m^2$. Thus, since neither of the references, either alone or in combination, disclose or suggest each and every limitation of the claimed blood purifier, they do not render obvious claim 1 or any of its dependent claims.

At page 4, the Office Action states that it would have "obvious to one skilled in this art at the time this invention was made to improve the retention of hydrophilic polymer in the membrane[.]" Applicants respectfully disagree with this characterization.

The '563 patent discloses that elution of a hydrophilic polymer from a dialyzer membrane is reduced by subjecting the membrane to gamma-irradiation, thereby cross-linking the membrane. (See the '563 patent at, e.g., paragraph 0017 and the working Examples). However, Applicants respectfully point out that as Kawata et al. discloses in the working examples that exemplary hollow filter membranes sterilized with gamma-radiation became clogged with "appreciable remaining blood." (See Kawata et al. at column 15, lines 13-15). In view of this, the skilled artisan would have recognized that the hollow filter membranes embraced by Kawata et al., which have a smaller pore diameter on the outer surface and a reduced hydrophilic polymer concentration in the outer surface, are not suitable for cross-linking by gamma-irradiation. Thus, there would have not been a reason for the skilled artisan to combine the disclosure of Kawata et al. and the '563 patent to arrive at the claimed invention, nor would the artisan have believed there to be a reasonable expectation of success in the combination.

Even assuming *arguendo* that it would have been obvious in view of the '563 patent to improve the retention of hydrophilic polymer in a hollow fiber membrane of Kawata et al. as alleged by the Office Action, Applicants point out that a low amount of a hydrophilic polymer eluted from a hollow filter membrane is not the only inventive feature of the claimed blood purifiers. As discussed above, the claimed blood purifiers are characterized by: (i) an amount of the hydrophilic polymer eluted from the hollow fiber membrane is 10 ppm or less; (ii) an ratio of the hydrophilic polymer in the outer surface of the hollow fiber membrane is 25 to 50 mass %; (iii) a burst pressure of the hollow fiber membrane is 0.5 MPa or higher; (iv) a coefficient of water permeability of the blood purifier is 150 $ml/m^2/hr./mmHg$ or higher; and (v) an average hole area of the outer surface of the hollow fiber membrane is 0.3 to 1.0$\mu m^2$. Since neither Kawata et al. nor the '563 patent disclose or suggest blood purifiers containing each and every one of the aforementioned characteristics, and the Office Action has not provided evidence that a

skilled artisan would have had a reason to combine the cited references to arrive at the claimed invention, the instant claims are not obvious in view of the cited references.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection under 35 U.S.C. §103.

## CONCLUSION

For the reasons set forth above, Applicants submit that all grounds for rejection have been overcome and that all of the pending claims are now in condition for allowance, which action is earnestly requested. Applicants do not accede to any positions of the Examiner not specifically addressed above.

In the event that a telephone conversation could expedite the prosecution of this application, the Examiner is requested to call the undersigned at the number provided below.

No fees are believed to be due. However, please apply any charges or credits to deposit account 06-1050, referencing Attorney Docket No. 19461-003US1.

Respectfully submitted,

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Jack Brennan
Reg. No. 47,443

Fish & Richardson P.C.
Citigroup Center
52nd Floor
153 East 53rd Street
New York, New York 10022-4611
Telephone: (212) 765-5070
Facsimile: (212) 258-2291